

**DETAILED ACTION**

1. This Office action is in response to the amendment filed on May 16, 2008.
2. **Claims 1, 5-13, 17-25, and 27-30** are pending.
3. **Claims 1, 5, 11-13, 16, 17, 23-25, 27, and 29** have been amended.
4. **Claims 2-4, 14-16, 26, and 31** have been cancelled.
5. **Claims 1, 5-13, 17-25, and 27-30** are allowed, renumbered as 1-23.
6. The objections to Claims 5, 12, 16, 17, and 24 are withdrawn in view of Applicant's amendments to the claims or cancellation of the claims.
7. The 35 U.S.C. § 112, second paragraph, rejections of Claims 1, 3-13, and 15-31 are withdrawn in view of Applicant's amendments to the claims or cancellation of the claims.

***Examiner's Amendment***

8. An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this Examiner's amendment was given in a telephone interview with Raymond Y. Mah (Reg. No. 41,426) on June 4, 2008.

The application has been amended as follows:

**AMENDMENTS TO THE CLAIMS**

Please cancel Claims 3, 4, 15, 16, 26, and 31 and amend Claims 1, 13, 25, 27, and 29 as follows:

1. (currently amended) A control program testing method for testing a control program which is written in a certain programming language by use of an automatic code generator which produces automatically a control program which is corresponding in contents with a control model indicating a control specification and written in the certain programming language to perform the control model, with requisite control specifications thereof being written in a requisite control specifications writing language, the control program testing method comprising steps of:

producing operation results of a simulator which simulates operation of the control model and operation results of program execution section which executes the control program, while making a relational linkage between each of corresponding operation results; ~~and~~

comparing the operation results of the simulator and the operation results of the program execution section upon detecting suspends of simulation and program execution; and

testing presence or absence of abnormality in at least one of the control model and the control program with respect to each relational linkage;

wherein said each relational linkage is made about corresponding contents between the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generator and the control program which is produced from the control model,

wherein the relational linkage is made for one of the control model and the control program based on the setting of a break point which specifies a suspend point of operation and for the other based on a setting of a corresponding break point based on the correspondence information, and

wherein the break point is adapted to set individually for functional blocks which constitute the control model.

3. (canceled)

4. (canceled)

13. (currently amended) A control program testing apparatus for testing a control program which is written in a certain programming language by use of automatic code generation means which produces automatically a control program which is corresponding in contents with a control model indicating a control specification and written in the certain programming language to perform the control model, with requisite control specifications thereof being written in a requisite control specifications writing language, the control program testing apparatus comprising:

synchronizing means which produces operation results of simulation means which simulates operation of the control model and operation results of program execution means which executes the control program, while making a relational linkage between each of

corresponding operation results, the simulation means and the program execution means being operated concurrently; and

comparing means for comparing the operation results of the simulation means and the operation results of the program execution means upon detecting suspends of simulation and program execution; and

testing means for testing presence or absence of abnormality in at least one of the control model and the control program based on output operation results with respect to each relational linkage;

wherein the synchronizing means makes said each relational linkage about corresponding contents between the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generation means and the control program which is produced from the control model,

wherein the synchronizing means makes the relational linkage for one of the control model and the control program based on the setting of a break point which specifies a suspend point of operation and for the other based on setting of a corresponding break point based on the correspondence information, and

wherein the break point is set individually for functional blocks which constitute the control model and the synchronizing means causes simulation means and the program execution means to operate in a synchronized manner.

16. (canceled)

25. (currently amended) A computer readable medium tangibly storing therein a control program testing program which is used for testing a control program which is written in a certain programming language by use of an automatic code generator which produces automatically a control program which is corresponding in contents with a control model indicating a control specification and written in the certain programming language to perform the control model, with requisite control specifications thereof being written in a requisite control specifications writing language, the control program testing program, upon execution through a computer, performing steps comprising:

testing presence or absence of abnormality in at least one of the control model and the control program;

generating, from information provided at automatic generation of the control program, correspondence information which indicates a correspondence relationship between the control model and the control program, and making a relational linkage between each of a plurality of suspend points of operation of a simulator which simulates the control model and a corresponding one of a plurality of suspend points of operation of program execution section which executes the control program based on the correspondence information;

directing the simulator and the program execution section to proceed to the simulation and the program execution;

detecting a suspend of the simulator and a suspend of the program execution section following the simulation and program execution; and

comparing a simulation result of the control model and an execution result of the control program upon detecting suspends of simulation and program execution, and testing the presence or absence of abnormality based on the comparison result with respect to each relational linkage;

wherein said each relational linkage is made about corresponding contents between the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generator and the control program which is produced from the control model,

wherein the correspondence information includes execution position correspondence information which is information indicating the relationship between corresponding positions of the control model and the control program, and

wherein the making a relational linkage of suspend points based on the correspondence information is that which sets, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulator and the program execution section, a break point which specifies a corresponding spot of the other based on the execution position correspondence information.

27. (currently amended) The computer readable medium tangibly storing therein a control program testing program as in claim ~~[[26]]~~25,

wherein the testing of the presence or absence of abnormality based on the comparison result tests the presence or absence of abnormality by at least comparing one of the suspend points of simulation of the control model and one of the suspend points of execution of the control program based on the execution position correspondence information.

29. (currently amended) A computer readable medium tangibly storing therein a control program testing program which is used for testing a control program which is written in a certain programming language by use of an automatic code generator which produces automatically a control program which is corresponding in contents with a control model indicating a control specification and written in the certain programming language to perform the control model, with requisite control specifications thereof being written in a requisite control specifications writing language, the control program testing program upon execution through a computer, performing:

testing of presence or absence of abnormality in at least one of the control model and the control program;

generating, from information provided at automatic generation of the control program, correspondence information which indicates a correspondence relationship between the control model and the control program, and making a relational linkage between each of a plurality of suspend points of operation of a simulator which simulates the control model and a corresponding one of a plurality of suspend points of operation of program execution section which executes the control program based on the correspondence information, the testing of

presence or absence of abnormality in at least one of the control model and the control program being made with respect to each relational linkage;

directing the simulator and the program execution section to proceed to the simulation and the program execution;

detecting a suspend of the simulator and a suspend of the program execution section following the simulation and program execution; and

producing a simulation result of the simulator and an execution result of the program execution section upon detecting suspends of simulation and program execution, and testing the presence or absence of abnormality based on a comparison result with respect to each relational linkage;

wherein said each relational linkage is made about corresponding contents between the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generator and the control program which is produced from the control model,

wherein the correspondence information includes execution position correspondence information which is information indicating the relationship between corresponding positions of the control model and the control program, and

wherein the making a relational linkage of suspend points based on the correspondence information is designed to set, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulator and the program execution section, a break



point which specifies a corresponding spot of the other based on the execution position  
correspondence information.

31. (canceled)

-- END OF AMENDMENT --

*Reasons for Allowance*

9. The following is an Examiner's statement of reasons for allowance:

The cited prior art taken alone or in combination fail to teach, in combination with the other claimed limitations, "wherein the relational linkage is made for one of the control model and the control program based on the setting of a break point which specifies a suspend point of operation and for the other based on a setting of a corresponding break point based on the correspondence information, and wherein the break point is adapted to set individually for functional blocks which constitute the control model" as recited in independent Claims 1 and 13; and further fail to teach, in combination with the other claimed limitations, "wherein the correspondence information includes execution position correspondence information which is information indicating the relationship between corresponding positions of the control model and the control program, and wherein the making a relational linkage of suspend points based on the correspondence information is that which sets, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulator and the program execution

section, a break point which specifies a corresponding spot of the other based on the execution position correspondence information” as recited in independent Claims 25 and 29.

The closest cited prior art, the combination of US 6,708,329 (hereinafter “Whitehill”), US 2002/0174415 (hereinafter “Hines”), and US 6,587,995 (hereinafter “Duboc”), teaches a computer system for translating simulation system modules utilized to model behavior of a target system into modules compatible with a target system platform for controlling the target system to act in accordance with the simulation. However, the combination of Whitehill, Hines, and Duboc fails to teach “wherein the relational linkage is made for one of the control model and the control program based on the setting of a break point which specifies a suspend point of operation and for the other based on a setting of a corresponding break point based on the correspondence information, and wherein the break point is adapted to set individually for functional blocks which constitute the control model” as recited in independent Claims 1 and 13; and further fails to teach “wherein the correspondence information includes execution position correspondence information which is information indicating the relationship between corresponding positions of the control model and the control program, and wherein the making a relational linkage of suspend points based on the correspondence information is that which sets, by being rendered the setting of a break point which specifies a suspend point of operation of one of the simulator and the program execution section, a break point which specifies a corresponding spot of the other based on the execution position correspondence information” as recited in independent Claims 25 and 29.

Any comments considered necessary by Applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

10. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Qing Chen whose telephone number is 571-270-1071. The Examiner can normally be reached on Monday through Thursday from 7:30 AM to 4:00 PM. The Examiner can also be reached on alternate Fridays.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wei Zhen, can be reached on 571-272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 2191

/QC/

June 4, 2008

/Wei Zhen/

Supervisory Patent Examiner, Art Unit 2191